PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 03 01 684 285	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/DK2004/000390	International filing date *(day/month/year)* 08.06.2004	Priority date *(day/month/year)* 10.06.2003
International Patent Classification (IPC) or national classification and IPC G01L9/00		
Applicant DANFOSS A/S et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20.12.2004	10.10.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Debesset, S Telephone No. +31 70 340-4802

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/DK2004/000390

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-8 as originally filed

   Claims, Numbers

   1-14 received on 20.12.2004 with letter of 20.10.2004

   Drawings, Sheets

   1/2, 2/2 as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☒ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☒ the claims, Nos. 15-17
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/DK2004/000390

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-14
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-14
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 STATE OF THE ART

Reference is made to the following document:

D1: US 2002/073533 A1 (PARK KYONG M) **20 June 2002** (2002-06-20)
D2: US-A-6 036 194 (STAMPER BILLY L) **14 March 2000** (2000-03-14)

2 CLARITY (Article 6 PCT)

Some phrases used in claim 1 and 13 are not clear. An interpretation of these phrases is given. The reasoned statement given hereafter with regard to novelty and inventive step is based on this interpretation.

The phrases concerned are the following:

2.1 *" the sealing member **forming** a sleeve"* used in claim 1 (line 12) and claim 13 (line 7): this formulation gives the impression that the sealing member is made of other parts than a sleeve, which is not supported by the description and the figures. Therefore the above phrase is interpreted as follows: *" the sealing member **formed by** a sleeve".*

2.2 *" exceed the yield point of **at least one of** the sealing member, **the component and the house"*** used in claim 1 (lines 19-21): the feature in bold is not supported by the description. Indeed it is stated (see from page 4, line 25 to page 5, line 2) that the applied pressures should not exceed the yield point of the house and the component in order to avoid any dimensional change.Therefore the above phrase is interpreted as follows: *" exceed the yield point of the sealing member"*

2.3 *" exceeds the yield point of **at least one of** the sealing member **and the house"*** used in claim 13 (lines 12-13): for the same reasons as in 2.2 the above phrase is interpreted as follows: *" exceeds the yield point of the sealing member"*

3 NOVELTY (Article 33(1) and (2) PCT)

3.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

A method for forming a pressure proof assembly between a component (1) and a house (12, 18), the house (12, 18) having an opening between a high pressure and a low pressure side, said method comprising a step of:

- arranging the component (1) in the opening.

3.2 The subject-matter of claim 1 differs from this known method by the following additional steps:

- arranging a sealing member between the component and the house, the sealing member being formed by a sleeve with an annular body with an outer and an inner peripheral surface wherein at least one of the outer and inner peripheral surfaces is tapered, and

- pressing the sealing member into contact with the component and the house so that the pressures between the surfaces of the sealing member and the house exceed the yield point of at least one of the sealing member, so as to seal between the component and the house.

3.3 The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

3.4 The same reasoning applies, mutatis mutandis, to the corresponding independent claim 13, which therefore is also considered to be new.

3.5 Claims 2-12 and 14 are dependent on claims 1 and 13 and as such also meet the requirements of the PCT with respect to novelty.

4 INVENTIVE STEP (Article 33(1) and (2) PCT)

4.1 The problem to be solved by the present invention may be regarded as providing a method of forming a high pressure proof assembly which enables a more simple manufacturing process and which is suitable when said assembly comprises temperature sensitive components.

4.2 None of the documents D1 and D2 discloses or hints at the features in combination of the solution proposed in claim 1 (see point 3.2) to solve the probem posed.

4.3 The subject-matter of claim 1 is therefore inventive (Article 33(3) PCT).

4.4 The same reasoning applies, mutatis mutandis, to the corresponding independent claim 13, which therefore is also considered to be inventive.

4.5 Claims 2-12, 14 are dependent on claims 1 and 13 are as such also meet the requirements of the PCT with respect to inventive step.

APPLICATION NO: PCT/DK2004/000390
APPLICANT: DANFOSS A/S
OUR REF: 03 01 684 285

NEW CLAIMS OCTOBER 2004

1. A method for forming a pressure proof assembly between a component and a house forming an opening between a high pressure and a low pressure side, said method comprising the steps of:

- arranging the component in the opening,

- arranging a sealing member between the component and the house, the sealing member forming a sleeve with an annular body with an outer and an inner peripheral surface wherein at least one of the outer and inner peripheral surfaces is tapered, and

- pressing the sealing member into contact with the component and the house so that the pressures between the surfaces of the sealing member and the component and between the surfaces of the sealing member and the house exceed the yield point of at least one of the sealing member, the component and the house, so as to seal between the component and the house.

2. A method according to claim 1, wherein the yield point is exceeded for the sealing member.

3. A method according to claims 1 or 2, wherein the component is an oblong component comprising a set of electrical terminals.

4. A method according to any of the preceding claims, wherein the component has a polygonal cross-sectional shape.

5. A method according to claim 2, wherein the component comprises a pressure sensor.

6. A method according to any of claims 2-5, wherein the component is made from a material selected from the group consisting of silicon and glass.

7. A method according to any of the preceding claims, wherein the sleeve has a circular cross-sectional shape.

8. A method according to any of the preceding claims, wherein the sleeve is made of a ductile material.

9. A method according to any of the preceding claims, wherein the sleeve is provided with an adhesive component applied to at least one of the outer and inner peripheral surfaces.

10. A method according to any of the preceding claims, wherein the sleeve is made from a material comprising a metal selected from the group consisting of tantalum, copper, nickel, indium, niobium and tin.

11. A method according to any of the preceding claims, wherein the opening has a cross sectional area at a first axial end which is larger than a cross sectional area at an opposite second axial end.

12. A method according to claim 11, wherein the first axial end of the opening is towards the high pressure side of the house.

13. An assembly comprising a house, a pressure sensor extending through an opening in the house and a sealing member arranged in the opening between the house and the sensor, the sealing member forming a sleeve with an annular body with an outer and an inner peripheral surface wherein at least one of the outer and inner peripheral surfaces is tapered, the sealing member being pressed into engagement with the sensor and the house under a pressure which exceeds the yield point of at least one of the sealing member and the housc.

14. An assembly according to claim 13, wherein the sealing member is made from a material comprising a metal selected from the group consisting of tantalum, copper, nickel, indium, niobium and tin.